

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (currently amended): Vacuum load lock semiconductor wafer processing equipment, comprising:

- a load lock chamber,
- a transfer chamber,
- a reaction chamber located above said transfer chamber, and
- a robot located outside said load lock chamber that includes a wafer transfer arm that is configured to support said semiconductor wafers in the reaction chamber during a wafer processing process,

wherein said wafer transfer arm is adapted to operate inside said load lock chamber and inside a vacuum, and is adapted to transfer said semiconductor wafers between the load lock chamber, the transfer chamber, and the reaction chamber.

Claim 2 (previously presented): The vacuum load lock semiconductor processing equipment described in Claim 1, further comprising:

- a load lock chamber exhaust port through which gases within the load lock chamber can be evacuated,
- a transfer chamber exhaust port through which gases within the transfer chamber can be evacuated, and
- a reaction chamber exhaust port through which gases within the reaction chamber can be evacuated.

Claim 3 (original): The vacuum load lock semiconductor processing equipment described in Claim 2, wherein said transfer chamber is evacuated from a position lower than said semiconductor wafers.

Claim 4 (original): The vacuum load lock semiconductor processing equipment described in Claim 1, further comprising:

an insulation separating plate adapted to separate said transfer chamber from said reaction chamber.

Claim 5 (original): The vacuum load lock semiconductor processing equipment described in Claim 1, wherein said reaction chamber comprises an insulating material.

Claim 6 (original): The vacuum load lock semiconductor processing equipment described in Claim 1, wherein said transfer chamber and said reaction chamber are configured to prevent formation of a film on an interior surface of said transfer chamber.

Claim 7 (currently amended): A method of processing semiconductor wafers, comprising:

providing a load lock chamber, a transfer chamber, and a reaction chamber, wherein said reaction chamber is located above said transfer chamber,

providing a robot that includes a wafer transfer arm, wherein said wafer transfer arm is adapted to operate inside said load lock chamber and inside a vacuum and to support said semiconductor wafers in the reaction chamber during a wafer processing process, and

transferring said semiconductor wafers between said load lock chamber, said transfer chamber, and said reaction chamber using said wafer transfer arm.

Claim 8 (previously presented): The method described in Claim 7, further comprising:

evacuating said reaction chamber by removing a gas within the reaction chamber through a reaction chamber exhaust port; and

evacuating said transfer chamber by removing a gas within the transfer chamber through a transfer chamber exhaust port.

Claim 9 (previously presented): The method described in Claim 7, further comprising:

evacuating said transfer chamber from a position lower than said semiconductor wafers.

Claim 10 (original): The method described in Claim 7, further comprising:

preventing a reaction gas in said reaction chamber from entering said transfer chamber by introducing an inactive gas into said transfer chamber.

Claim 11 (previously presented): The method described in Claim 7, further comprising:

preventing deposition on an interior surface of said reaction chamber by providing an insulating material on said interior surface of said reaction chamber.

Claim 12 (currently amended): The method described in Claim 7, further comprising:

preventing deposition on an interior surface of said transfer chamber by isolating said transfer chamber ~~from~~ from said reaction chamber.

Claim 13 (new): An apparatus for processing a semiconductor wafer, the apparatus comprising:

a load lock chamber;

a transfer chamber having a transfer chamber exhaust port configured to exhaust gases within the transfer chamber and the reaction chamber from a position lower than a wafer processing position;

a reaction chamber located above the transfer chamber; and

a wafer transfer arm that is adapted to transfer the semiconductor wafers between the load lock chamber, the transfer chamber, and the reaction chamber.

Claim 14 (new): The apparatus of Claim 13, wherein an insulating material is disposed on an interior surface of the reaction chamber.

Claim 15 (new): The apparatus of Claim 13, wherein there is no seal between the transfer chamber and the reaction chamber.

Claim 16 (new): The apparatus of Claim 13, wherein the reaction chamber is located completely above the transfer chamber.

Claim 17 (new): A method of processing a semiconductor wafer, the method comprising:

- providing a load lock chamber, a transfer chamber, and a reaction chamber, wherein the reaction chamber is positioned above the transfer chamber;

- moving a semiconductor wafer between the load lock chamber, the transfer chamber, and the reaction chamber using a wafer transfer arm;

- when the semiconductor wafer is not in the reaction chamber, removing gases from the transfer chamber and the reaction chamber through a transfer chamber exhaust port that is positioned below a wafer processing position; and

- when the semiconductor wafer is in the reaction chamber, removing gases from the transfer chamber and the reaction chamber through a reaction chamber exhaust port located in the reaction chamber.

Claim 18 (new): The method of Claim 17, further comprising:

- introducing an inactive gas into the transfer chamber;

- flowing the inactive gas from the transfer chamber to the reaction chamber during a wafer processing operation; and

- exhausting the inactive gas through the reaction chamber exhaust port during the wafer processing operation.

Claim 19 (new): The method of Claim 17, further comprising providing an insulating material on an interior surface of the reaction chamber.

Claim 20 (new): The method of Claim 19, wherein the semiconductor wafer separates the reaction chamber from the transfer chamber in the wafer processing position without a seal.

Claim 21 (new): The method of Claim 17, further comprising pressurizing the transfer chamber with an inactive gas during a wafer processing operation.

Claim 22 (new): The method of Claim 17, further comprising switching an active exhaust port from the transfer chamber exhaust port to the reaction chamber exhaust port.

Claim 23 (new): A wafer processing apparatus comprising:

- a load lock chamber;
- a transfer chamber;
- a reaction chamber located above the transfer chamber; and
- a wafer transfer arm that is configured to move a wafer between the load lock chamber, the transfer chamber, and the reaction chamber, and that is configured to support the wafer in the reaction chamber during a wafer processing operation.

Claim 24 (new): The wafer processing apparatus of Claim 23, further comprising a transfer chamber exhaust port that is positioned below a wafer processing position.

Claim 25 (new): The wafer processing apparatus of Claim 23, further comprising an insulation separating plate positioned between the transfer chamber and the reaction chamber.

Claim 26 (new): The wafer processing apparatus of Claim 23, further comprising an insulating material provided on an interior surface of the reaction chamber.

Claim 27 (new): A method comprising:

- moving a semiconductor wafer from a load lock chamber to a transfer chamber using a wafer transfer arm;

- holding the semiconductor wafer in a transfer holding position in the transfer chamber;

- exhausting gases from a reaction chamber and the transfer chamber through a transfer chamber exhaust port that is positioned below the transfer holding position;

- moving the semiconductor wafer from the transfer chamber to the reaction chamber, wherein the semiconductor wafer is supported in the reaction chamber by the wafer transfer arm during a wafer processing operation;

- supplying an inert gas to the transfer chamber; and

- exhausting the reaction chamber and the transfer chamber through a reaction chamber exhaust port during the wafer processing operation.

Claim 28 (new): The method of Claim 27, further comprising providing an insulating material on an interior surface of the reaction chamber.

Claim 29 (new): The method of Claim 27, wherein an insulation separating plate is provided between the transfer chamber and the reaction chamber.

Claim 30 (new): The method of Claim 27, further comprising switching an active exhaust port from the transfer chamber exhaust port to the reaction chamber exhaust port.